

## Supplementary information

### Regulation of Interfacial Stability and Lithium-Ion Transport in $\text{LiMn}_{0.6}\text{Fe}_{0.4}\text{PO}_4$ Cathodes via a Boroxine-based Electrolyte Additive

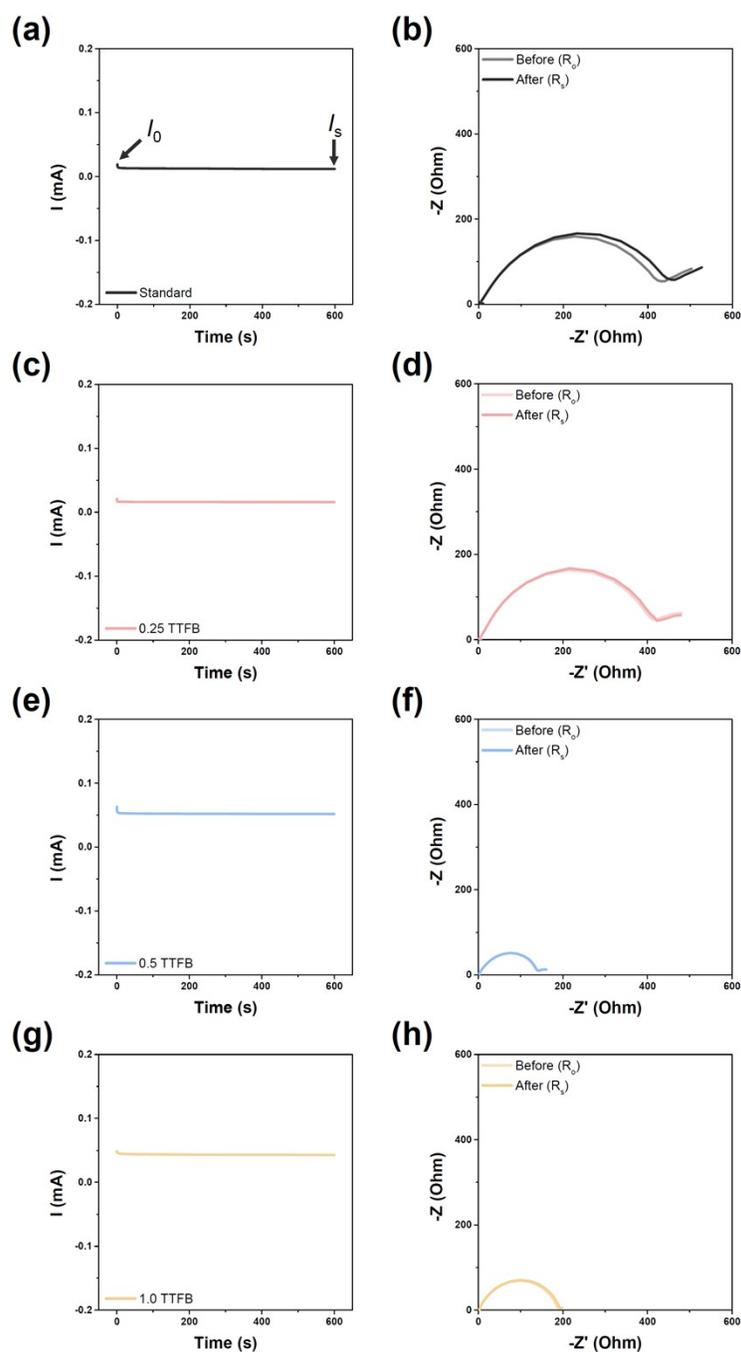
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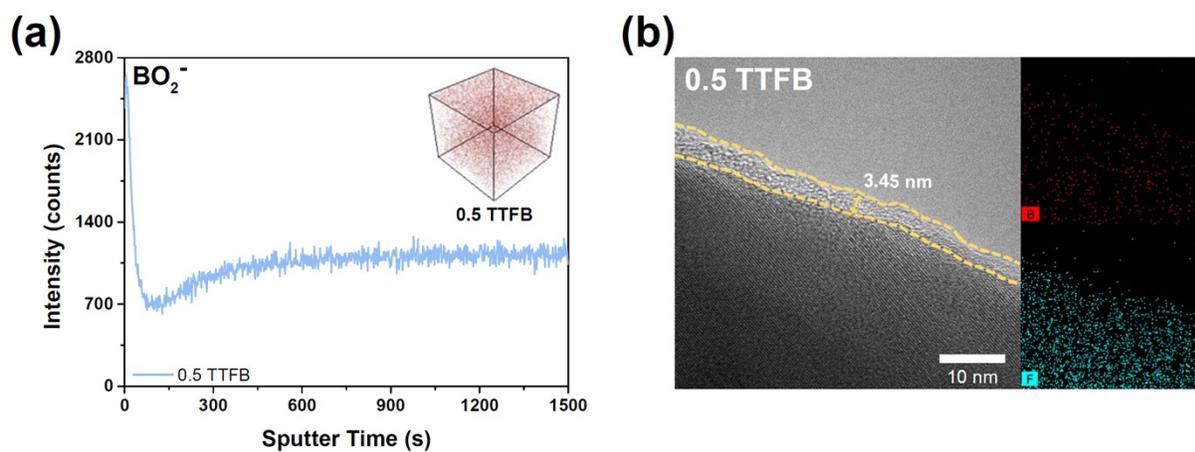
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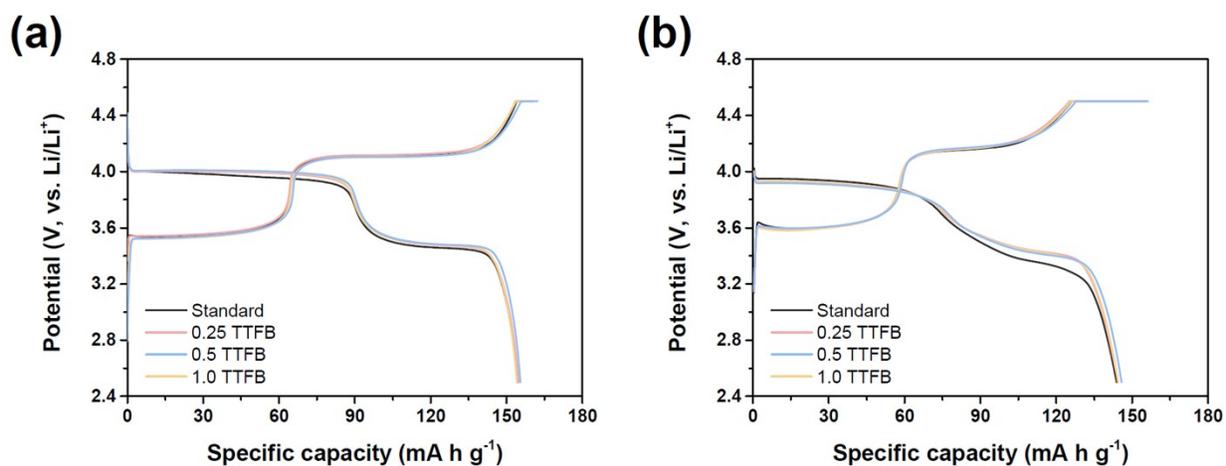
Corresponding Author: yte0102@inu.ac.kr (T. Yim)



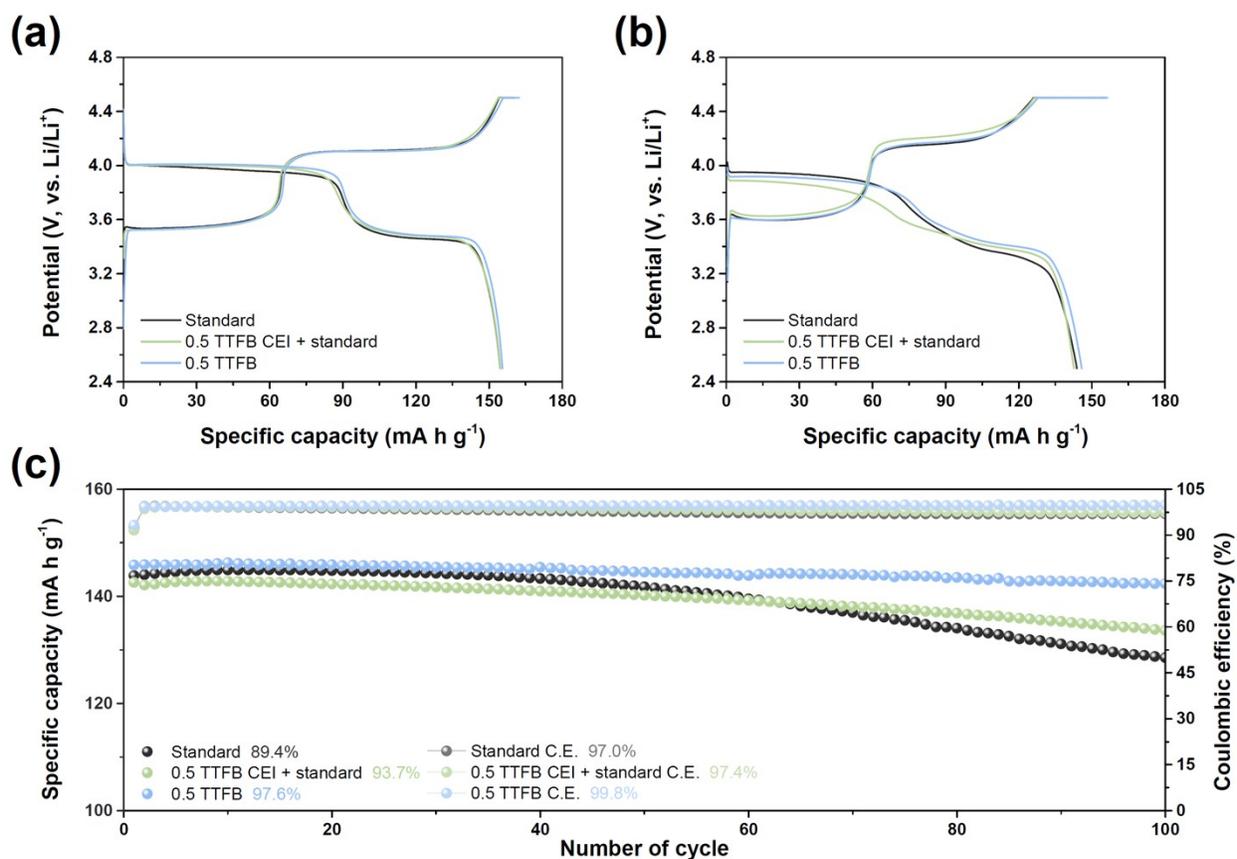
**Fig. S1.** Chronoamperometry curves of Li/Li symmetric cells under a DC polarization of 10 mV for 10 min for (a) Standard electrolyte, (c) 0.25 TTFB, (e) 0.5 TTFB, and (g) 1.0 TTFB. (b, d, f, h) Corresponding EIS spectra measured before and after polarization for the Standard electrolyte, 0.25 TTFB, 0.5 TTFB, and 1.0 TTFB, respectively, in the frequency range of 100 kHz to 14 Hz.



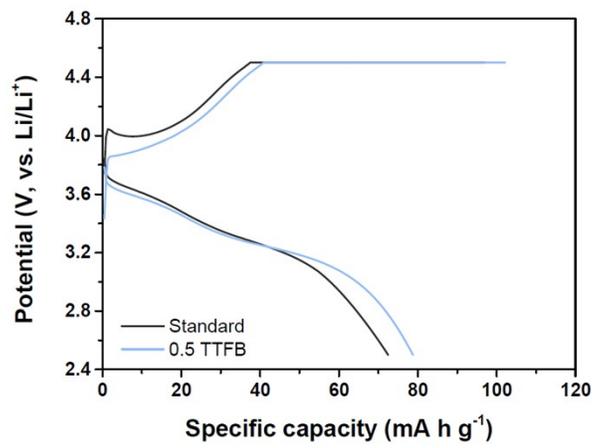
**Fig. S2.** (a) TOF-SIMS depth profiles and 3D ion distribution maps of  $\text{BO}_2^-$ , and (b) TEM image with corresponding EDS elemental maps of B and F for the LMFP electrode after formation with 0.5 TTFB.



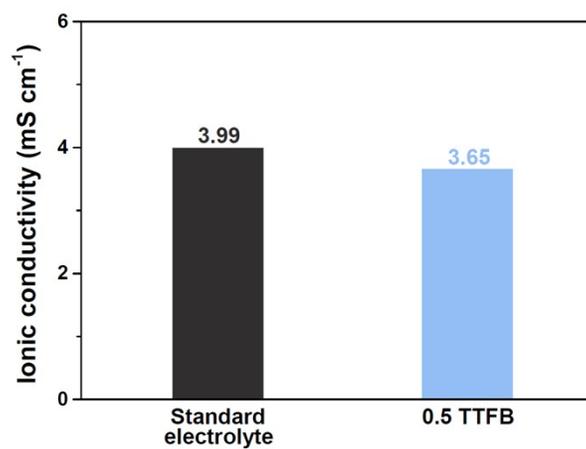
**Fig. S3.** Charge–discharge profiles of LMFP/Li cells corresponding to Fig. 4c: (a) formation at 0.1 C and (b) first cycle at 1.0 C and 25 °C.



**Fig. S4.** Charge–discharge profiles and cycling performance of LMFP/Li cells under different electrolyte conditions at 25 °C: (a) formation at 0.1 C, (b) first cycle at 1.0 C, and (c) cycling performance with corresponding coulombic efficiency at 1.0 C.



**Fig. S5.** First-cycle charge-discharge profiles of LMFP/Li cells at 1.0 C and  $-10\text{ }^{\circ}\text{C}$ , corresponding to Fig. 4h.



**Fig. S6.** Ionic conductivity of the standard electrolyte and 0.5 TTFB electrolyte measured at  $-10$  °C.